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Impact, Consequences and Challenges**

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# Revisiting Bank of Japan's Policy Duration Commitment: Impact, Consequences and Challenges\*

Tomohiro Kinoshita<sup>+</sup>

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**Abstract:** Forward guidance or more specifically policy duration commitment invented and developed by the Bank of Japan has become an essential part of unconventional monetary policy instruments employed by modern central banks. This paper's simple empirical analysis finds that the market believes or perceives Bank of Japan's policy duration commitment to be credible, which has in turn helped the Bank to manage expectations of future interest rates and control the level and shape of the yield curve at an extraordinarily low range. The suppressed yield curve has contributed to reduction of financing costs for businesses and households and has supported macroeconomic growth through the conventional interest rate channel of policy transmission. However, forward guidance including policy duration commitment does have difficulties. The magnitude of its impact has been time-variant, which appears to depend on evolution in policy frameworks and communication skills. More importantly, this paper projects that the extraordinarily low and flattened yield curve coupled with maturity extension of the Bank assets could pose threats to the future income of the central bank in the event of policy normalization, which could have unintended fiscal implications.

**Keywords:** policy duration commitment, forward guidance, unconventional monetary policy, yield curve, central bank income

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## Section 1: Introduction

After the recent global financial crisis, “forward guidance” has gained recognition within the central banking community and the monetary economics academia as one of the most powerful tools in the panoply of central bank policy instruments. Policy communication for transparency is not merely an obligation of central banks as public organizations in a democratic society. Policy communication has now become an indispensable tool that modern day central banks must employ strategically and proactively to enhance the efficacy of monetary policy conduct. Forward guidance could exert its influence on the financial and the economic conditions even if it is not accompanied by actual policy actions to change interest rates or to increase the monetary base.

Forward guidance is a product of monetary policy evolution in the 21<sup>st</sup> century. The inventor of forward guidance is the Bank of Japan (BOJ)<sup>1</sup>. The original Japanese naming of the concept was *Jikan-jiku Seisaku*, time horizon policy, if literally translated into English word-for-word. At present, the prevailing terminology used for calling this concept is forward guidance. But in order to distinguish this BOJ invention from other forms of broadly defined forward guidance, this paper shall call this forward guidance à la Bank of Japan “policy duration commitment.”

The primary objective of this paper is to revisit BOJ’s policy duration commitment and to reevaluate the impact of this policy instrument. Although there is a colossal of valuable academic literature on unconventional monetary policy instruments, existing research focused on BOJ’s policy duration commitment is still limited. This paper intends to attract and invite more participants in this area of research by shedding some light not only on the positive impact of the policy duration commitment but also on the unintended consequences and challenges of policy duration commitment.

This paper is organized as follows. Section 2 will provide factual explanations on BOJ’s policy duration commitment. How and when it was invented? How did it evolve? Section 3 will conduct a literature review of existing research in this area. Although Section 3 is intended to be brief, it will have to extend the coverage to include broadly defined forward guidance, because the number of existing literature written using the terminology “policy duration commitment” is relatively small. Section 4 will evaluate how strong this central bank commitment is being perceived by the market. This will be measured by capturing the immediate response of the Japanese

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<sup>1</sup> BOJ Governor Haruhiko Kuroda stated in Kuroda (2014) “The Bank of Japan was the first central bank ever to adopt what is often referred to as unconventional monetary policy” at the end of the 1990s and added “And although this is not widely known, it was the Bank that first introduced forward guidance.”

Government Bond (JGB) yield curve and the implied forward rates to BOJ's quarterly publication of economic forecasts. Section 5 will provide future projections of BOJ net income. It intends to shed light upon quasi-fiscal policy consequences which might arise in the process of policy normalization from unconventional monetary policies. Section 6 concludes this paper by sharing the author's ideas on future challenges central banks and academic scholars may face in the age of forward guidance.

## **Section 2: Bank of Japan's Policy Duration Commitment**

### **Subsection 2.1: General Description**

Policy duration commitment is a direct commitment of central banks to continue a certain policy framework in the future. Because policy duration commitment would require announcement of guidance information about the future course of monetary policy, policy duration commitment can be considered as one typical form of monetary policy conduct employing forward guidance. Simply put, policy duration commitment is a subset of broadly defined forward guidance<sup>2</sup>.

In the 21<sup>st</sup> century, especially after the 2008 global financial crises, many central banks in this world have resorted to unconventional monetary policy tools or unorthodox policy measures. One of such unconventional policy tools for central banks is to make a commitment today about continuing a certain policy framework in the future. Such policy framework would include maintaining future policy rates near 0 % or continuing periodic purchases of target assets in pre-set amounts.

Narrowly defined forward guidance is merely a central bank's projection or a central bank's forecast of future economic conditions which can only indirectly suggest the future course of monetary policy. In contrast, policy duration commitment is a direct commitment about future monetary policy. Thus, policy duration commitment needs to specify the policy framework central banks would commit to in the future and also indicate the duration during which time central banks would continue.

The duration of such policy commitment can be fixed, conditional or unconditional. Unconditional policy commitment would imply that a certain policy framework would continue as long as central banks do not explicitly announce termination or changes.

Policy commitment with fixed duration would set a specific date or time when a certain policy framework would be terminated. This is often called calendar-based policy duration commitment or calendar-based forward guidance.

In cases where the duration of policy commitment is conditional, central banks commit to continuation of a policy framework including maintenance of policy rates and asset purchases until certain macroeconomic conditions are met in the future. Thus, policy duration commitment is in effect a declaration by central banks that they

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<sup>2</sup> The definition or semantics of this "forward guidance" terminology deserves careful attention and thorough discussions. Campbell, Evans, Fisher and Justiniano (2012) provide an enlightening distinction between Odyssean forward guidance and Delphic forward guidance. According to their characterization, in the former, central banks publicly commit to future policy actions, whereas, in the latter, central banks publicly state their forecasts of future macroeconomic developments and "likely or intended monetary policy actions." Therefore, BOJ's policy duration commitment discussed in this paper would qualify as one form of Odyssean forward guidance based on the Campbell et al (2012) distinction.

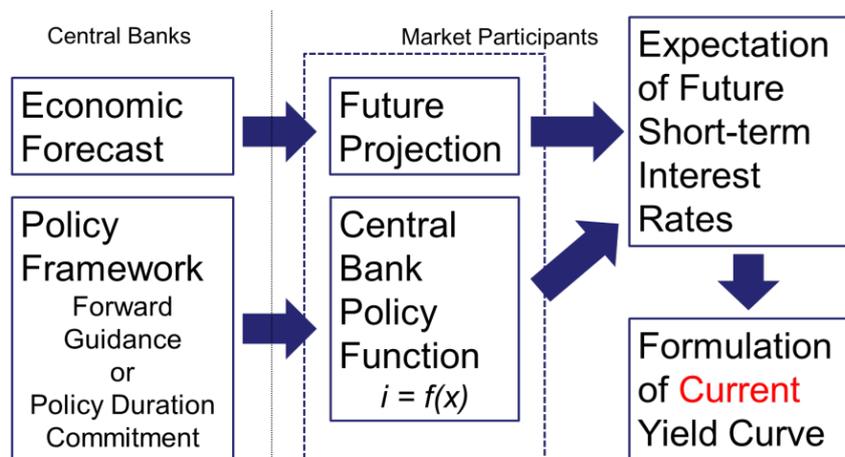
shall follow state-contingent monetary policy in the future.

Such *conditions* could be phrased in qualitative descriptions of future economic conditions or could be quantitatively defined using numerical thresholds. Some central banks which have adopted inflation targeting regimes apply the targeted inflation level as this numerical threshold and commit to continuation of a certain policy framework until this policy target is achieved.

Why does policy duration commitment matter? What does central bank communication achieve? Commitment and communication about the future course of monetary policy matter because they are essential elements for the formulation of expectations about *future* interest rates and the *current* yield curve.

Figure 1 provides a conceptual diagram on how central bank’s communication about the policy framework and future projections of economic conditions and prices could change the expectations for future short-term policy rates and the current longer-term interest rates on the yield curve. This concept finds its foundations in the traditional expectations theory of the term structure of interest rates.

Figure 1: What Does Central Bank Communication Achieve?



(Source) Author’s production

BOJ is the pioneer central bank which invented and employed the policy duration commitment conditioned on the achievement of numerical thresholds. Although BOJ did not officially introduce inflation targeting until January 2013, BOJ’s policy duration commitment has been conditioned on numerical thresholds primarily defined by inflation indices since March 2001. The next subsection will describe how BOJ has invented, developed and employed this policy duration commitment.

## **Subsection 2.2: Evolution of Bank of Japan’s Policy Duration Commitment**

### **2.2.1: Zero Interest Rate Policy**

In February 1999, BOJ announced that it would encourage the uncollateralized overnight call rate to move as low as possible by providing ample funds and would continue with the zero interest rate policy (ZIRP) “until deflationary concerns subside.” Although the duration of the commitment to continue zero interest rate policy was conditioned on such qualitative description of economic conditions, this could be understood as a precursor to the subsequent introduction of policy duration commitment conditioned on numerical thresholds in 2001.

In August 2000, BOJ judged that deflationary concerns would be dispelled and that the conditions for lifting the zero interest rate policy had been met. Thus, the Bank discontinued the zero interest rate policy and allowed the policy rate to nudge up to around 0.25 %.

### **2.2.2: Quantitative Easing**

In March 2001, BOJ introduced the Quantitative Easing (QE) monetary policy framework. The Bank’s QE consisted of four measures: increase in BOJ current account balances where commercial banks hold reserves; reintroduction of zero interest rate policy; policy duration commitment; and increase in outright purchase of long-term government bonds subject to the banknote rule. Of the four components of this QE monetary policy framework, the first measure increasing BOJ current account balances can be called the narrowly defined quantitative easing.

The third component of BOJ’s March 2001 QE framework was the policy duration commitment. This is the first policy duration commitment conditioned on numerical thresholds in the history of central banking. The Bank announced a strong commitment to continue the narrowly defined quantitative easing and zero interest rate policies until the CPI (consumer price index, excluding perishables, on a nationwide statistics) registers stably a 0 % or an increase year on year.

In October 2003, BOJ decided to release its interim assessment of the economy between the publications of the semiannual Outlook for Economic Activity and Prices (Outlook Report). The Bank also clarified what it exactly meant by the numerical condition phrase “CPI registering stably a zero percent or an increase year on year.” The Bank explained that this condition would not be met unless many Policy Board members make the forecasts in which the forecasted core CPI would register above 0 % during the forecasting period<sup>3</sup>.

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<sup>3</sup> In the statement “Enhancement of Monetary Policy Transparency” released on October 10<sup>th</sup>, 2003,

Market participants interpreted this clarification to mean that BOJ was strongly committed to continue QE until the Policy Board majority forecasts core CPI inflation to be positive across all forecasting periods in the Outlook Report.

In light of steady economic recovery and the expectations that positive CPI inflation would continue, BOJ exited from the QE monetary policy framework in March 2006<sup>4</sup>.

### **2.2.3: Comprehensive Monetary Easing**

In October 2010, BOJ introduced the Comprehensive Monetary Easing (CE) framework. CE consists of three measures: reintroduction of zero interest rate policy; policy duration commitment; and establishment of Asset Purchase Program encompassing JGBs, CP, corporate bonds, ETFs and J-REITs.

In the second component of CE, BOJ clarified the policy time horizon based on the “understanding of medium- to long-term price stability” which the Policy Board of the Bank agreed to in March 2006. The Bank announced its commitment to maintain the virtually zero interest rate policy until it judges that price stability is in sight using the “understanding” as the criterion<sup>5</sup>.

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BOJ published the following understanding about the conditions for the policy duration commitment.

“With the aim of laying the foundation for sustainable growth of Japan's economy, the Bank is currently committed to maintaining the quantitative easing policy until the consumer price index (excluding fresh food, on a nationwide basis, hereafter the core CPI) registers stably a zero percent or an increase year on year. Such commitment is underpinned by the following two conditions. First, it requires not only that the most recently published core CPI should register a zero percent or above, but also that such tendency should be confirmed over a few months. Second, the Bank needs to be convinced that the prospective core CPI will not be expected to register below a [sic] zero percent. This point will be described in such materials as the analysis and the forecasts of Policy Board members in the Outlook Report. To be more specific, many Policy Board members need to make the forecasts that the core CPI will register above a [sic] zero percent during the forecasting period.

The above conditions are the necessary condition. There may be cases, however, that the Bank will judge it appropriate to continue with quantitative easing even if these two conditions are fulfilled.”

<sup>4</sup> In March 9<sup>th</sup>, 2006, BOJ also released “The Introduction of a New Framework for the Conduct of Monetary Policy” where the Bank explained its “understanding of medium- to long-term price stability.” The document stated that the Policy Board members agreed that, by making use of the rate of year-on-year change in the consumer price index to describe the understanding, an approximate range between 0 and 2 % was generally consistent with the distribution of each Board member's “understanding of medium- to long-term price stability” and added that most Board members' median figures fell on both sides of 1 %. Later, in December 18<sup>th</sup>, 2009, the Bank provided clarifications of this “understanding” stating that the Policy Board did not tolerate a year-on-year rate of change in the CPI equal to or below 0 % and that the midpoints of most Policy Board members' “understanding” were around 1 %.

<sup>5</sup> On October 5<sup>th</sup>, 2010, BOJ announced “Comprehensive Monetary Easing” and stated that the Bank will maintain the virtually zero interest rate policy until it judges, on the basis of the “understanding of medium- to long-term price stability,” that price stability is in sight, on condition

Market participants interpreted this reinstated policy duration commitment to mean that BOJ was committed to continue the virtually zero interest rate policy until the Bank judges that year-on-year rate of change in the CPI around 1 % is in sight.

In February, 2012, BOJ expanded the scope of the policies to be continued under the policy duration commitment. The Bank announced its commitment to continue not only the virtually zero interest rate policy but also purchase of financial assets under the Asset Purchase Program<sup>6</sup>.

BOJ's expansion of the scope of the policy duration commitment is believed to be the first policy duration commitment by modern-day central bank which includes asset purchases as one core element of the policy framework to be continued<sup>7</sup>.

#### **2.2.4: Quantitative and Qualitative Monetary Easing**

On April 4<sup>th</sup>, 2013, BOJ announced that it will achieve the price stability target of 2 % “at the earliest possible time, with a time horizon of about 2 years,” and introduced the Quantitative and Qualitative Monetary Easing (QQE). QQE consists of four measures: adoption of monetary base increase as the operational indicator of quantitative easing; succession, overhaul and expansion of the Asset Purchase Program introduced by the former CE framework; integration of the two formerly separate modalities for JGB purchases; and policy duration commitment. In this policy duration commitment, the Bank stated that it “will continue with the quantitative and qualitative monetary easing, aiming to achieve the price stability target of 2 %, as long as it is necessary for maintaining that target in a stable manner.”

While the Bank emphasized that the QQE was a “new phase of monetary easing both in terms of quantity and quality,” it basically succeeded the traditional form of policy duration commitment which the Bank had been employing since March 2001. The duration of the policy commitment was conditioned on the numerical threshold, which was and is the price stability target of 2 % which had been adopted by the Bank

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that no problem will be identified in examining risk factors, including the accumulation of financial imbalances.

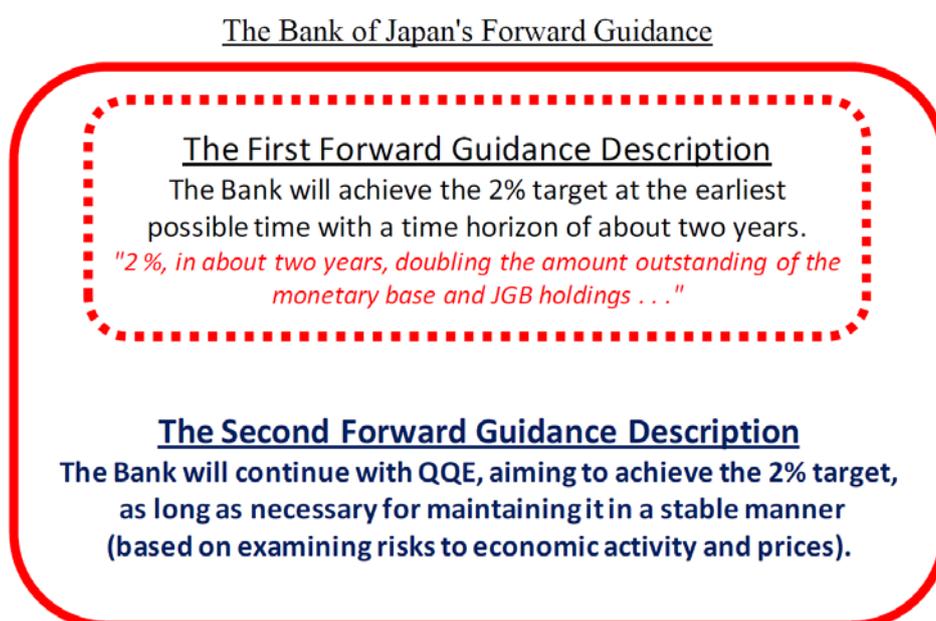
<sup>6</sup> On February 14<sup>th</sup>, 2012, the Bank announced “Enhancement of Monetary Easing” and published the “price stability goal in the medium to long term” which was judged to be within a positive range of 2 % or lower in terms of the year-on-year rate of change in the CPI and, more specifically, was set at 1 % as a goal for the time being. The Bank added that, for the time being, the Bank would continue pursuing the powerful easing by conducting its virtually zero interest rate policy and by implementing the Asset Purchase Program mainly through the purchase of financial assets until it judges that the 1 % goal in terms of the year-on-year rate of increase in the CPI is in sight.

<sup>7</sup> The Federal Reserve System in the United States is believed to be the first central bank that followed the footsteps of BOJ. On September 13<sup>th</sup>, 2012, the FOMC announced that the Federal Reserve would start monthly purchases of agency MBS at the pace of ¥ 40 billion which would continue until labor market conditions improve substantially.

in January 2013.

However, for purposes of emphasizing the Bank's strong resolve and determination to achieve the 2 % price stability target "at the earliest possible time, with a time horizon of about 2 years," the Bank in effect adopted a communication template for explaining QQE forward guidance structure consisting of 2 pillars. Figure 2 depicts the 2 pillar structure of BOJ's forward guidance under QQE<sup>8</sup>.

Figure 2: BOJ's Forward Guidance under QQE



(Source) Shirai (2014), Chart 2

<sup>8</sup> The interpretation of QQE forward guidance consisting of 2 pillars requires careful reading of the official statements. Shirai (2014) admits that some market participants considered that the first description is a strong calendar-based commitment. BIS economists Filardo and Hofmann (2014) interpreted that QQE included elements of both threshold- and calendar-based forward guidance but without explicit forward guidance on the policy rate. Please also see Momma and Kobayakawa (2014).

### **Section 3: Literature Review on Policy Duration Commitment**

#### **Subsection 3.1: Commitment to What?**

Earlier works by Krugman (1998) and Eggertsson and Woodford (2003) advocated the significance of central bank commitment, especially when faced with liquidity traps or the zero lower bound of policy rates. In order to “stimulate serious research” on the issue regarding credible policy commitment, Krugman (1998) suggested that BOJ credibly commit to 4 % inflation for 15 years. On the other hand, Eggertsson and Woodford (2003) proposed that central banks credibly commit to history-dependent price-level targeting rules which would “create the right kind of expectations regarding the way in which monetary policy will be used subsequently” through the management of expectations about the entire future path of short-term nominal interest rates which “the central bank can clearly control” and “follow through on its commitment.”

Here exists an important conceptual distinction regarding policy commitment. Krugman (1998) advocated central bank commitment to policy outcomes or policy targets, whereas Eggertsson and Woodford (2003) advocated central bank commitment to policy instruments especially future short-term interest rates. In this respect, Eggertsson and Woodford (2003) should be regarded as the first proponents of forward guidance or policy duration commitment discussed in this paper.

#### **Subsection 3.2: Assessing the Japanese Experience**

Ugai (2007) provided an extensive and informative literature review of theoretical and empirical research regarding the Japanese experience mainly during the Zero Interest Rate Policy era and the Quantitative Easing (QE) era. Many empirical studies covered in Ugai (2007) find that BOJ’s policy duration commitment contributed to lowering the expectations of expected future short-term interest rates and the yield curve<sup>9</sup>. Such studies also add that the increase in BOJ current account balances worked as a signal which enhanced the Bank’s policy duration commitment effect.

Subsequent studies on BOJ QE era policies such as Shiratsuka (2010) and Nakajima, Shiratsuka and Teranishi (2010) confirm the above findings. However, it should be noted that these studies showed that policy duration commitment succeeded in managing the expectations of future policy rates, but did not argue that policy duration commitment succeeded in creating inflation expectations. In fact, Okina and

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<sup>9</sup> Okina and Shiratsuka (2004), Baba, Nishioka, Oda, Shirakawa, Ueda and Ugai (2005) and Oda and Ueda (2005) all find that Bank’s policy duration commitment was effective in bringing down the yield curve. But, in the event-study analyses conducted by Bernanke, Reinhart and Sack (2004), the evidence for the effectiveness of BOJ policies was “more mixed than in the case of the United States.”

Shiratsuka (2004) and Nakajima et al (2010) provide empirical evidence which indicates that policy duration commitment alone was not sufficient to reverse deflation coupled with low economic growth or deflationary expectations in financial markets.

With respect to the Japanese experience after the recent global financial crises or the great recession, Momma and Kobayakawa (2014) explain BOJ actions and its policy intentions. The number of empirical studies which extend the coverage to the Comprehensive Monetary Easing (CE) era and the Quantitative and Qualitative Monetary Easing (QQE) era are limited so far, but hopefully more are in the pipeline. The pioneering works include Ueda (2012), Fujiwara, Nakazono and Ueda (2014) and Ito (2014). Based on empirical evidence from the news analysis, Ueda (2012) finds that BOJ's forward guidance, which managed expectations of future short-term policy rates, and targeted asset purchases both moved asset prices in the expected directions, but adds that such measures failed to stop the deflationary trend.

In this light, this paper intends to contribute to the empirical studies examining the impact of policy duration commitment by BOJ and its consequences covering not only the QE era but also the CE and QQE eras.

### **Subsection 3.3: Assessing the US Experience**

In the United States, policy makers and economists in the Federal Reserve System have made positive evaluations about the efficacy and macroeconomic performance of the forward guidance which the US central bank provided in the past decade. For example, Campbell et al (2012) show empirical evidence which suggested FOMC's success in communicating its future intentions to the public and further suggested "communication difficulties do not present an insurmountable barrier to monetary policy based on Odyssean forward guidance."

BIS economists recognize the contributions of forward guidance as well. In their paper examining major central banks' recent increased reliance on forward guidance, Filardo and Hofmann (2014) conclude that it "has so-far reduced the near-term policy expectations about the future path of policy interest rates, suggesting that near-term policy intentions have been clarified."<sup>10</sup> Such evaluations have made policy makers confident enough to characterize policy communication as the central element of effective monetary policy<sup>11</sup>.

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<sup>10</sup> Filardo and Hofmann (2014) also note that, beyond the impact on near-term policy rate volatility, the evidence is more mixed and caution against believing in the continuation of forward guidance practices in the period after the exit from unconventional monetary policy.

<sup>11</sup> Bernanke (2013) stated "Communication about policy is likely to remain a central element of the Federal Reserve's efforts to achieve its policy goals." Yellen (2012) and Yellen (2013) made

In contrast, economists in the academia have not given favorable evaluations of actual practices of forward guidance by the Federal Reserve. Woodford (2012), the leading proponent of forward guidance, examined the intraday US dollar OIS rates on January 25<sup>th</sup>, 2012 when a new forward guidance statement was announced and found “market participants did not attach a 100 percent probability to maintenance of an unchanged target” for three years into the future. He commented that forward guidance recently practiced by the Federal Reserve does not represent an ideal model because it “has taken only the form of *predictions* about the future path of the funds rate, given what can be known at present.” Friedman (2014) expresses his skepticism about “central banks’ attempts at guiding market participants’ expectations of the future trajectory of monetary” based on his analytical model proposed in Friedman (2013)<sup>12</sup>.

Moreover, analysis of large-scale asset purchases (LSAPs) by the Federal Reserve has produced empirical evidence indicating the “portfolio-balance” effect which lowers the risk premiums<sup>13</sup>. Studies have not found strong evidence supporting the signal effect of LSAPs which could lower the expectations of future interest rates<sup>14</sup>.

Krishnamurthy and Vissing-Jorgensen (2011) and Krishnamurthy and Vissing-Jorgensen (2013) examined LSAPs and found evidence for various channels, including signaling channel, safety channel, scarcity channel and capital constraints channel, through which LSAPs lowers interest rates. Recognition of the signaling channel raised the question whether the Federal Reserve could have achieved the same outcome with only a statement on policy commitment or forward guidance, without actually purchasing the assets.

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similar remarks regarding policy communication and transparency.

<sup>12</sup> As the reason for his skepticism, Friedman (2014) points out the uncertainty regarding how much departure from the target policy makers will tolerate. Yellen (2012) recognizes this issue of deviation tolerance and explains that, at the Federal Reserve which has the dual mandate of maximum employment and price stability, the essence of the balanced approach is that “reducing the deviation of one variable from its objective must at times involve allowing the other variable to move away from its objective.”

<sup>13</sup> Gagnon, Raskin, Remache and Sack (2011) show that reductions in interest rates primarily reflect lower risk premiums.

<sup>14</sup> Before the Federal Reserve terminated LSAPs in October 2014, the FOMC statements included sentences which indicate that the Federal Reserve “will continue its purchases of Treasury and agency mortgage-backed securities, and employ its other policy tools as appropriate, until the outlook for the labor market has improved substantially in a context of price stability.” Thus, the Federal Reserve was at the time announcing two separate termination criteria for asset purchases and for maintenance of 0 to 1/4 percent target range for the federal funds rate. This could have made the management of expectations for future policy even more difficult for the Federal Reserve. Shirai (2014) compared this with BOJ’s QQE forward guidance where the continuation conditions are applied to the entire QQE framework as one package.

### **Subsection 3.4: Issues and Challenges**

Literature review of existing research on policy duration commitment and forward guidance reveals three issues which require further discussion.

First is the incentive mechanism which enhances the credibility of central bank commitment. In this vein, Bhattarai, Eggertsson and Gafarov (2014) show that shortening the duration of outstanding government debt provides an incentive to the central bank to keep short-term real interest rates low in the future in order to avoid capital losses.

Second is the future exit from unconventional monetary policy measures. Krishnamurthy and Vissing-Jorgensen (2013) argue that clear communication of LSAP policy rules is beneficial for preparation of exit steps. Findings in Ito (2014) imply that exit policies would require coordination between the fiscal policy and monetary policy authorities.

Third is further development of academic theory on monetary policy employing policy duration commitment. Fujiwara et al (2014) warns that, theoretically, the only effective tool left for the central banks under the liquidity trap today is forward guidance or signaling role of the quantitative easing. Although Krugman (1998), Eggertsson and Woodford (2003) and Friedman (2014) may differ in their understanding of the role forward guidance should play in modern central banking policies, they commonly argue that central banks can and do actually employ more than one independent policy instrument other than the conventional policy instrument of controlling short-term interest rates. Traditional theories in monetary economics have established their models based on the premises that central banks can control only one independent policy instrument, but Friedman (2014) argues that monetary policy theory now needs to recognize the existence of at least two independent policy instruments.

## Section 4: Evaluation of Bank of Japan’s Policy Duration Commitment

### Subsection 4.1: Methodology

This section will evaluate the efficacy of BOJ’s policy duration commitment. The evaluation will be conducted by analyzing the market reaction to the quarterly inflation forecast in the Outlook Report. This is because the market’s response to the forecast would indicate the credibility of the central bank’s policy commitment.

Let us assume that the inflation forecast published by BOJ is below the threshold level. Based on the policy duration commitment, this would imply to market participants longer duration and further continuation of a certain policy framework. Therefore, the market’s perceived strength of the commitment would be reflected in the size of the immediate market reaction such as the shift in the yield curve or the changes in the implied forward rates following the announcement of such below-threshold forecast.

Table 1 is the Bank of Japan Policy Board’s forecast of real GDP growth and inflation announced on January 22<sup>nd</sup>, 2009. Figure 3 and Figure 4 show the market reaction to BOJ announcement of the monetary policy statement and the forecasts. The median of the CPI forecast for Fiscal 2010 was -0.4 %, which was 1.4 % points smaller than the 1 % CPI inflation threshold contemplated in the “understanding of medium- to long-term price stability” which had been announced in March 2006.

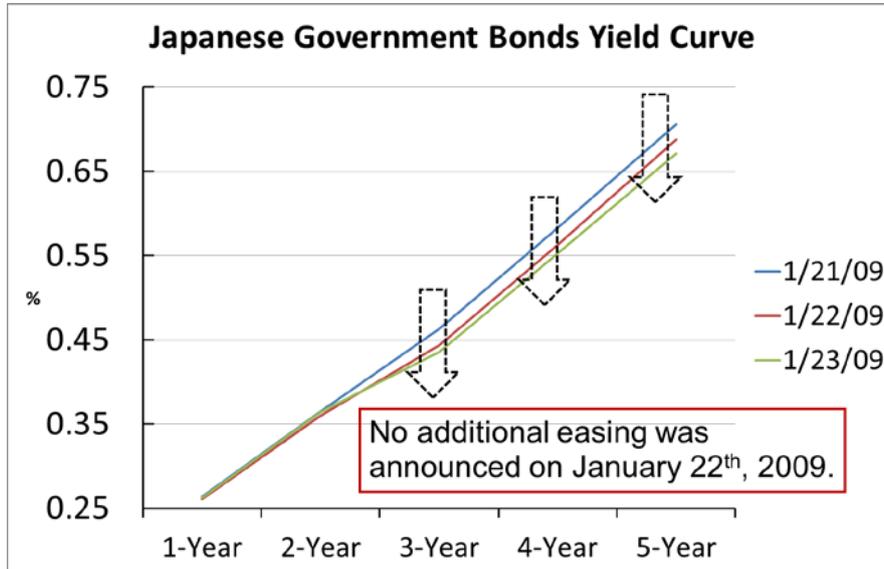
Table 1: An Example of BOJ’s Forecasts of the Economy and Prices

#### Forecasts of the Majority of Policy Board Members

	Real GDP	Domestic CGPI	CPI (excluding fresh food)
Fiscal 2008	-2.0 to -1.7 [-1.8]	+3.0 to +3.2 [+3.1]	+1.1 to +1.2 [+1.2]
Forecasts made in October 2008	+0.1 to +0.2 [+0.1]	+4.3 to +4.8 [+4.6]	+1.5 to +1.6 [+1.6]
Fiscal 2009	-2.5 to -1.9 [-2.0]	-7.0 to -6.0 [-6.4]	-1.2 to -0.9 [-1.1]
Forecasts made in October 2008	+0.3 to +0.7 [+0.6]	-1.4 to -0.4 [-0.8]	-0.2 to +0.2 [0.0]
Fiscal 2010	+1.3 to +1.8 [+1.5]	-1.5 to -0.8 [-0.9]	-0.6 to 0.0 [-0.4]
Forecasts made in October 2008	+1.5 to +1.9 [+1.7]	-0.3 to +0.5 [+0.3]	+0.1 to +0.5 [+0.3]

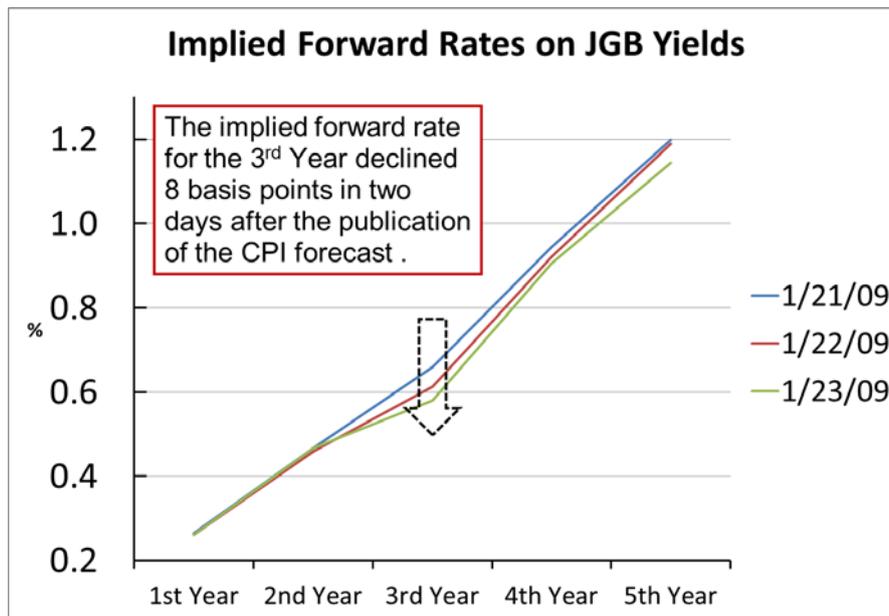
(Source) Bank of Japan “Statement on Monetary Policy” January 22<sup>nd</sup>, 2009

Figure 3: Downward Shift in the JGB Yield Curve



(Source) Author's calculations based on JGB data published by the Ministry of Finance

Figure 4: Decline in the Implied Forward Rates



(Source) Author's calculations based on JGB data published by the Ministry of Finance

Although no additional policy action for monetary easing was announced on January 22<sup>nd</sup>, 2009, market reacted to the surprise news and shifted the yield curve downward for the 3-Year, 4-Year and 5-Year Japanese Government Bonds. Moreover, the implied forward rates for the 3<sup>rd</sup> Year declined 8 basis points in two days after the publication of the CPI forecast by BOJ. While the decline of 8 basis points may

appear small in absolute terms, it is noteworthy that the expected funding cost for the 3<sup>rd</sup> Year was cut by as much as one eighth even without any policy actions.

Based on these preliminary observations, this section shall analyze the market's perceived strength of central bank commitment by measuring market response in terms of changes in 2<sup>nd</sup> Year and 3<sup>rd</sup> Year implied forward rates immediately after BOJ's announcement of the below-threshold CPI forecast. Implied forward rates are calculated based on Japanese Government Bond yields data published daily by the Ministry of Finance.

Market response to the CPI forecast announcement is measured by simply calculating the average of changes in the implied forward rates. The changes are calculated by comparing the implied forward rates of the day before date of the CPI forecast announcement with those of the next business day of the CPI forecast announcement. This analysis will separately calculate the impact of the announcement of below-threshold CPI forecasts for the 2<sup>nd</sup> Fiscal Year on the 2<sup>nd</sup> Year implied forward rates and that for the 3<sup>rd</sup> Fiscal Year on the 3<sup>rd</sup> Year implied forward rates.

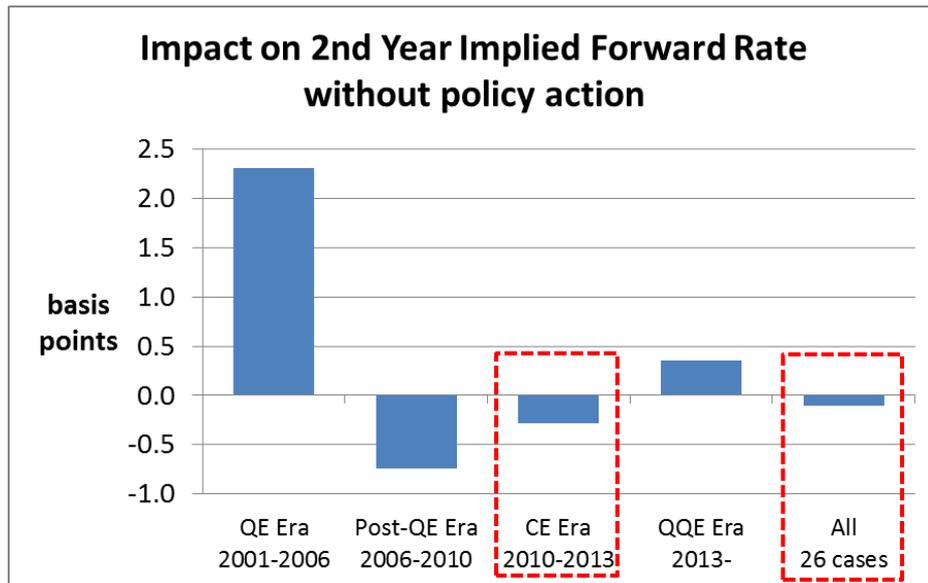
In many cases where the announced CPI forecast was below the threshold, the forecast announcement was accompanied by BOJ's actual monetary policy actions, which may contaminate this paper's measurement. Therefore, in order to primarily focus on the market's perception of the credibility of central bank commitment, the next subsection will first look into cases where the below-threshold CPI forecast announcement was *not* accompanied by BOJ's actual monetary policy actions. This will enable this analysis to isolate the changes in market's expectation of BOJ future monetary policy, which should reflect the market's perceived strength of central bank commitment. In the second step, this analysis will also compare the results in such cases with the results in cases where the below-threshold CPI forecast announcement was accompanied by additional easing actions.

#### **Subsection 4.2: Results of the Analysis**

Between April 2001 and March 2015, BOJ announced its forecasts of future economic conditions and prices in quantitative terms 42 times. These include the semiannual publications Outlook Report and the interim assessment between them. Within these 42 announcements, there were 33 cases where CPI forecasts for the 2<sup>nd</sup> Fiscal Year were the below the threshold and, in 7 of such cases, BOJ announced additional easing. There were 14 cases where CPI forecasts for the 3<sup>rd</sup> Fiscal Year were below the threshold and, in only 3 of such cases, BOJ announced additional easing.

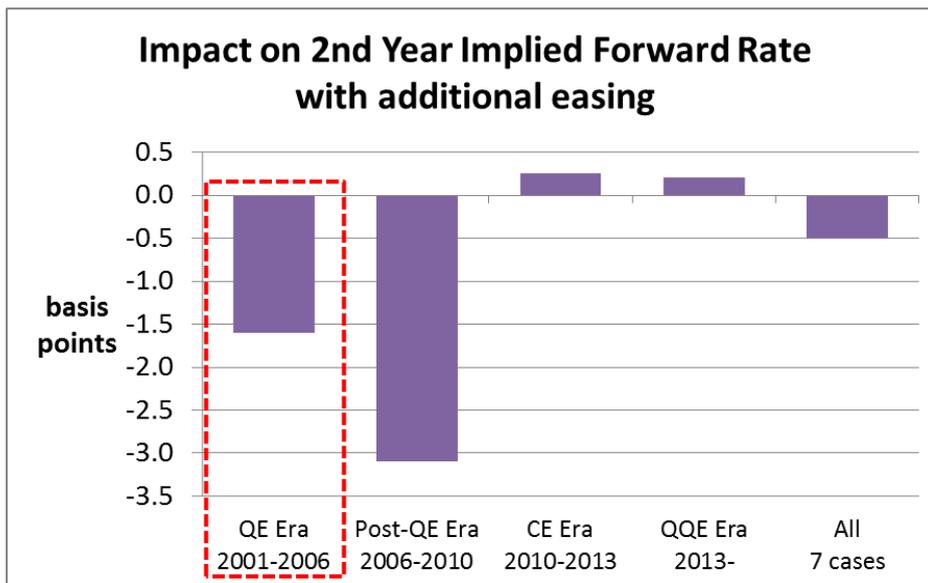
Figure 5 and Figure 6 illustrate the announcement impact on the 2<sup>nd</sup> Year implied forward rates. Figure 5 measures the impact in cases where the below-threshold CPI forecast announcement was not accompanied by policy action. On the other hand, Figure 6 measures the impact in cases when additional easing was also announced.

Figure 5: Impact on the 2<sup>nd</sup> Year Implied Forward Rate (1)



(Source) Author's calculations based on JGB data published by the Ministry of Finance

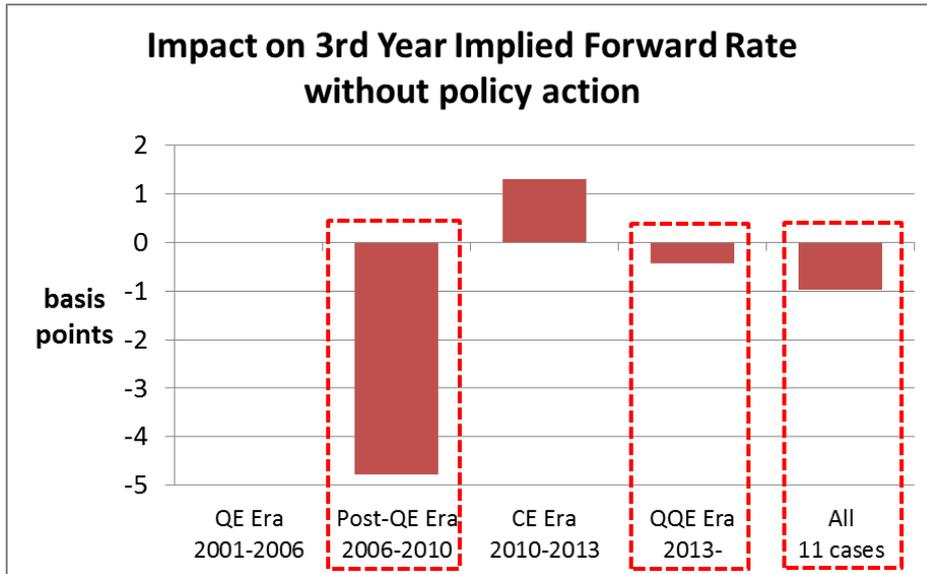
Figure 6: Impact on the 2<sup>nd</sup> Year Implied Forward Rate (2)



(Source) Author's calculations based on JGB data published by the Ministry of Finance

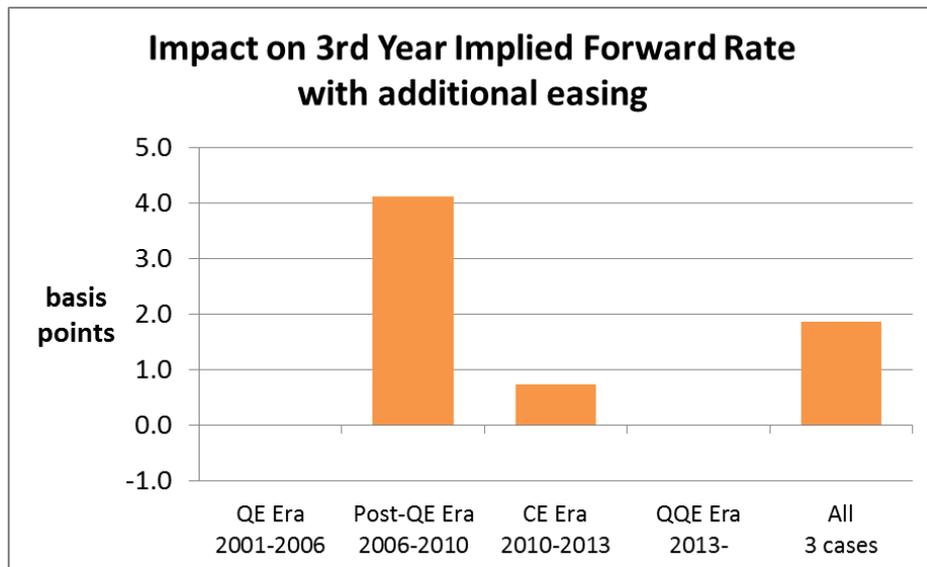
Figure 7 and Figure 8 illustrate the announcement impact on the 3<sup>rd</sup> Year implied forward rates. Figure 7 measures the impact in cases where the below-threshold CPI forecast announcement was not accompanied by policy action. On the other hand, Figure 8 measures the impact in cases when additional easing was also announced.

Figure 7: Impact on the 3<sup>rd</sup> Year Implied Forward Rate (1)



(Source) Author's calculations based on JGB data published by the Ministry of Finance

Figure 8: Impact on the 3<sup>rd</sup> Year Implied Forward Rate (2)



(Source) Author's calculations based on JGB data published by the Ministry of Finance

Table 2 lists all the results of this analysis.

Table 2: Impact on the 2<sup>nd</sup> Year and 3<sup>rd</sup> Year Implied Forward Rates

Average Change in the Implied Forward Rates Two Days after the Announcement of Below-threshold CPI Forecast				
	Impact on 2nd Year Implied Forward Rates		Impact on 3rd Year Implied Forward Rates	
	without policy actions (26 cases)	when accompanied by policy actions for additional easing (7 cases)	without policy actions (11 cases)	when accompanied by policy actions for additional easing (3 cases)
QE Era 2001–2006	2.30	–1.60	no cases	no cases
Post-QE Era 2006–2010	–0.74	–3.10	–4.77	4.12
CE Era 2010–2013	–0.28	0.25	1.30	0.75
QQE Era 2013–	0.36	0.20	–0.43	no cases
<b>All cases</b>	<b>–0.10</b>	<b>–0.50</b>	<b>–0.98</b>	<b>1.87</b>

(Source) Author’s calculations based on JGB data published by the Ministry of Finance

### Subsection 4.3: Findings and Interpretations

Close examinations of the results above reveal noteworthy facts about the impact of CPI forecast announcement which imply important lessons about policy duration commitment.

Figure 7 shows that, in the 11 cases where CPI forecasts for the 3<sup>rd</sup> Fiscal Year were below the threshold level but no additional policy actions were taken, the 3<sup>rd</sup> Year implied forward rate declined by an average of 1 basis point. It should be noted that the mere announcement of CPI forecast actually pushed the implied forward rate down even in the absence of any additional monetary easing actions.

In sharp contrast, Figure 5 shows that, in the 26 cases where CPI forecasts for the 2<sup>nd</sup> Fiscal Year were below the threshold level but no additional policy actions were taken, the 2<sup>nd</sup> Year implied forward rate declined by an average of only one tenth of 1 basis point. Below-threshold CPI forecasts for the 2<sup>nd</sup> Fiscal Year were no surprise news for the market, which had already been incorporated in the expectation for future policy rates.

Compared with the market reaction to 2<sup>nd</sup> Fiscal Year forecast, below-threshold CPI forecasts for the 3<sup>rd</sup> Fiscal Year were surprise news for the market. Such forecasts implied longer duration and further continuation of the current policy framework and made market participants revise down their expectation for future policy rates, possibly up until the end of the 3<sup>rd</sup> Fiscal Year. This could be interpreted as an indication that, to a certain extent, market participants believe or perceive that BOJ’s policy duration commitment is a credible commitment.

A closer look at the results of each era provides some interesting insights.

During the QE era, the first period when policy duration commitment was adopted, the implied forward rate declined only in one case when the forecast announcement was accompanied by policy action (Figure 6). This is in sharp contrast with Figure 5, where implied forward rates rose when the below-threshold CPI forecast announcements were not accompanied by additional policy action, which might suggest market disappointment at the time about BOJ's inaction despite the below-threshold CPI forecast.

During the Post-QE era, a remarkable decline in implied forward rates for the 3<sup>rd</sup> Year is observed (Figure 7). The indication that policy duration commitment was most effective during the Post-QE era is quite ironic because BOJ never officially admitted that it was utilizing policy duration commitment during the Post-QE era. Nonetheless, market participants in those days were apparently expecting the Bank to continue extraordinarily low interest rate policies and were convinced that the Bank would abstain from raising policy rates rapidly.

During the CE era, the 2<sup>nd</sup> Year implied forward rate slightly declined, but the 3<sup>rd</sup> Year implied forward rate rose (Figure 5 and Figure 7). This may imply that the market believed that BOJ's policy duration commitment was credible only up to the end of the 2<sup>nd</sup> Fiscal Year and had doubts about Bank's commitment to continue the policy framework in the 3<sup>rd</sup> Fiscal Year<sup>15</sup>.

The QQE era show mixed results. The 2<sup>nd</sup> Year implied forward rate rose and the 3<sup>rd</sup> Year implied forward rate declined only slightly (Figure 5 and Figure 7). As opposed to BOJ's rhetoric emphasizing the commitment terminology, it does not appear that the market participants perceive the Bank's policy duration commitment as a strong credible commitment.

What would explain such counter-intuitive results? One possible explanation is BOJ's emphasis on its strong commitment to achieve the price stability target of 2 % in two years. The words expressing the Bank's firm determination and strong resolve coupled with announcements of CPI forecasts for the 3<sup>rd</sup> Year indicating the possibility of success in achieving the price stability target could have been interpreted by market participants as a signal that the Bank might exit from or wind down QQE immediately

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<sup>15</sup> When BOJ introduced CE in October 2010, the Bank announced its commitment to maintain the virtually zero interest rate policy until it judges that price stability, understood as 1 % CPI inflation, is in sight. Thus, the policy duration commitment under CE was conditioned not on current economic conditions but on current projections of future economic conditions. Such forward-looking character of policy duration commitment gave room for speculation that the Bank might terminate CE at the time of the publication of the future CPI forecast achieving the 1 % inflation even if the current CPI inflation is below such threshold.

after CPI inflation reaches 2 % in about two years<sup>16</sup>.

Even a whiff of suspicion that the Bank might not continue the current QQE policy framework could affect the market expectation of future policy continuation. In spite of the Governor's often repeated comments that any discussion of exit policies are premature and his emphasis that the Bank is always ready to do whatever is necessary, the Bank's upbeat forecast which shows CPI inflation reaching 2% may be mitigating the intended impact of policy duration commitment.

It should be understood that the QQE framework is fighting two wars of commitment. On the one hand, the Bank succeeded the traditional policy duration commitment where the Bank is committed to continue the current policy framework until the policy target is achieved. On the other hand, the Bank is overtly emphasizing its strong commitment, resolve and determination to achieve the 2 % inflation target so as to change the prevailing deflationary mindset of the general public in Japan and to push up the inflation expectations close to 2 %.

But the two commitments could be interpreted by the market as if they were contradictory. The success of one might harm the intended effect of the other. As explained in Sub-subsection 2.2.4, QQE has been facing such subtle difficulty from the onset because of this dual commitment character embedded in the forward guidance structure.

#### **Subsection 4.4: Summary and Policy Implications**

The findings and interpretations can be summarized into the following three lessons.

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<sup>16</sup> The following are excerpts of the English translation of Governor Haruhiko Kuroda's comments at the press conference on April 4<sup>th</sup> 2013, the day QQE was announced. The author translated into English the original Japanese transcript of the press conference records. The Governor's comments expressing confidence and the emphasis on having exhausted all necessary measures could have unwittingly sent to the market messages which imply that the Bank might abstain from continuing the QQE framework and from taking additional easing actions after two years.

"The above-mentioned measures are monetary easing policies on a different dimension from the past. First of all, we have parted with the idea of sequential injection of armed forces and are determined to implement at this moment all necessary measures."

"This time, we have exhausted all necessary measures."

"As I have repeated today, we have mobilized every policy tool that is conceivable at this moment. We are determined to achieve the price stability target of 2 % with a time horizon of about two years. I am convinced that all necessary measures for that purpose are included in these policy measures. And I believe that we can achieve the target with the time horizon of about two years."

"The past approaches in monetary policy, where quantitative and qualitative monetary easing measures were incrementally implemented in a piecemeal manner, would not overcome deflation and achieve the price stability target of 2 %."

First, policy duration commitment was and is effective. Market participants, to a certain extent, believe or perceive BOJ's policy duration commitment to be a credible commitment. Such beliefs or perceptions appeared to have influenced the market's expectations of future policy and the formulation of the yield curve.

Second, the impact of the policy duration commitment was time-variant. The magnitude of the impact was influenced by the economic environment, evolution in the manner and scope of policy duration commitment, and communications skills of the central bank.

Third, although this may sound banal, communication skills and choice of words are critically important in policy duration commitment. For example, as explained in the interpretations for QQE forward guidance, the commitment to achieve the price stability target (policy target commitment) and the commitment to continue a certain policy framework (policy instrument commitment) could sound to the market as if they contradict with one another. It may help to allocate different terminologies to the two different types of commitments. Or it may help to reemphasize the Bank's continuation intent by further clarifying the definition of necessary conditions for policy continuation<sup>17</sup>.

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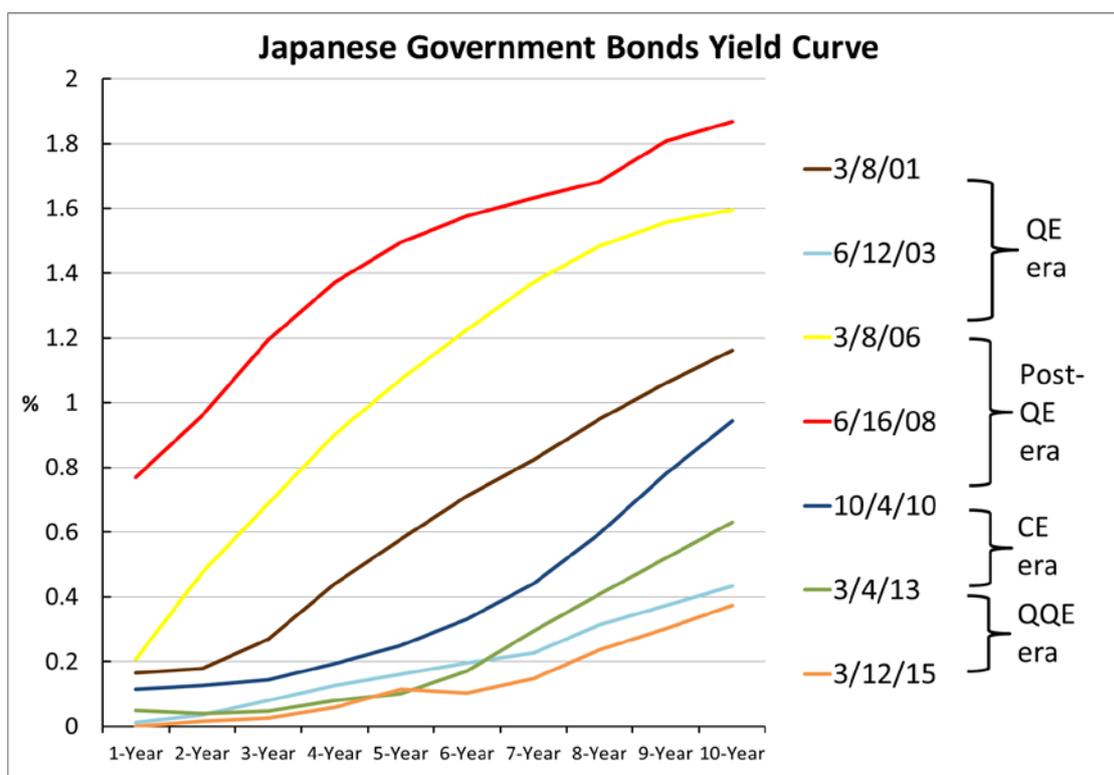
<sup>17</sup> Momma and Kobayakawa (2014) provide instructive explanations regarding forward guidance under the QQE framework. They write "It may well be understood that these 2 phrases in the statement constitute new forward guidance. These 2 pillars of forward guidance, however, are complementary. In other words, the QQE is state-contingent and open-ended in nature, and it is not appropriate to say that the QQE will be terminated automatically in 2 years irrespective of economic developments. The BOJ will continue with the QQE if it is judged necessary to do so in order to maintain that target in a stable manner. The aim is to set the 2 percent anchor deeply in the public's mindset and make the actual inflation rate hover around it. In terms of the Phillips curve, this means that the 2 percent inflation rate should become consistent with the average state of the economy; that is, when the output gap is zero."

## Section 5: Yield Curve Flattening and Bank of Japan's Income

### Subsection 5.1: Contributions of the Policy Duration Commitment

BOJ's policy duration commitment accompanied by other means of unconventional monetary policy instruments including monetary base increases, purchases of securities including Japanese Government Bonds and maturity extension in asset purchases contributed to lowering and flattening the yield curve (Figure 9).

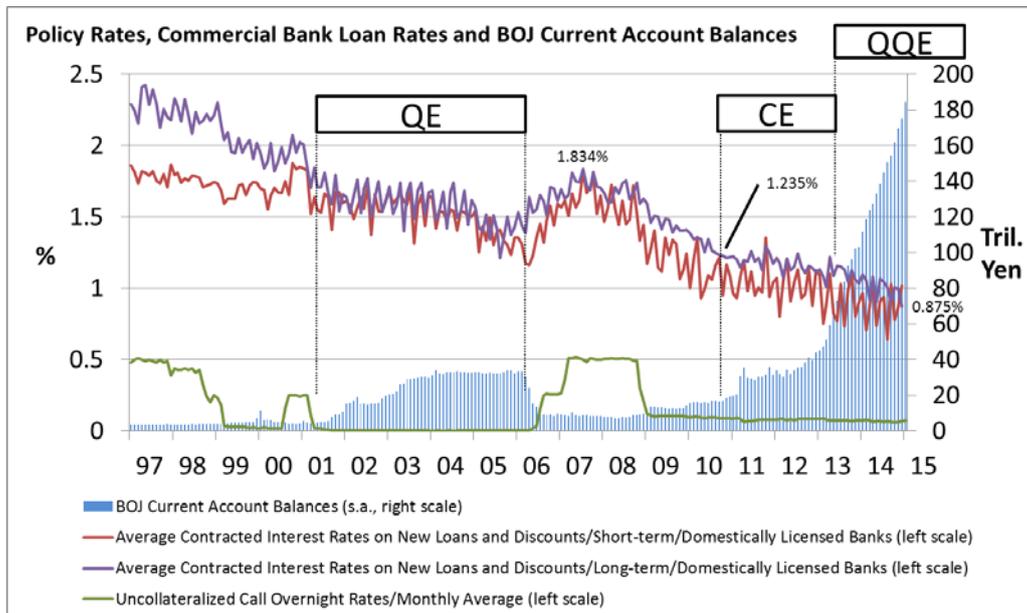
Figure 9: Bringing Down the Yield Curve



(Source) Author's calculations based on JGB data published by the Ministry of Finance

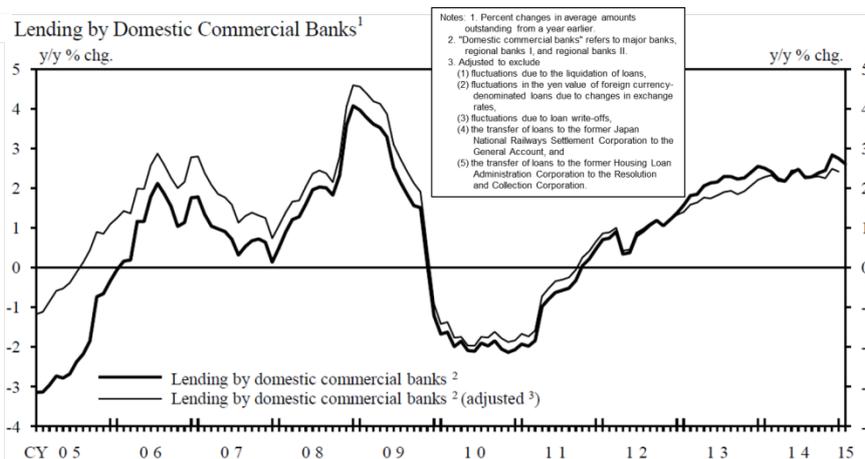
The decline in the yields in the range between 2-Year and 5-Year securities lead to the decline in the interest rates the commercial banks in Japan charge their borrowers for long-term loans. Figure 10 indicates that interest rates on commercial bank's long-term loans declined from 1.834 % in July 2007 to 0.875 % in December 2014, which is a decrease of nearly 1 % point while the policy rate, the uncollateralized call overnight rate, declined only by 0.5 % points. After BOJ introduced CE in October 2010, the interest rates charged on commercial bank's long-term loans declined for 36 basis points while the policy rate was virtually maintained at 0 %.

Figure 10: Decline in Commercial Bank Loan Rates



(Source) Author’s calculations based on data published by the Bank of Japan

Figure 11: Commercial Bank Loan Growth



(Source) Bank of Japan “Monthly Report of Recent Economic and Financial Developments: February 2015,” February 20<sup>th</sup>, 2015, Chart 32

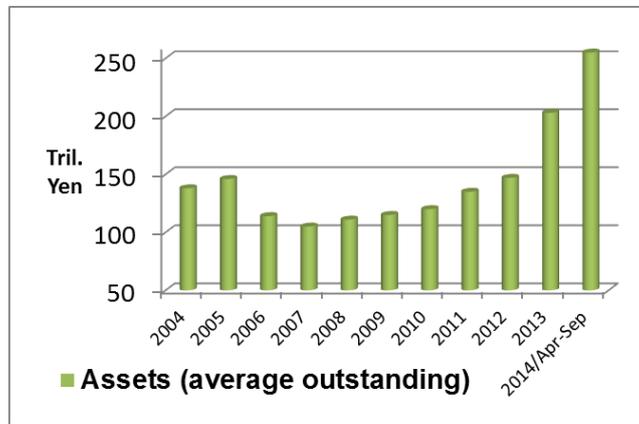
The decline in commercial bank loan rates reduced financing costs for businesses and households and spurred loan growth after 2011, which in turn supported economic recovery (Figure 11). Therefore, unconventional monetary policy in Japan including policy duration commitment helped the economy not through the unconventional policy transmission mechanisms but through conventional policy transmission mechanisms, which are the interest rate channel and the credit channel.

### Subsection 5.2: Asset Expansion and Maturity Extension

The decline and flattening of the yield curve is the intended outcome of BOJ's unconventional monetary policy including policy duration commitment. Needless to say, this was not achieved only by policy duration commitment but also by asset purchases which included JGBs of which the remaining maturities were long.

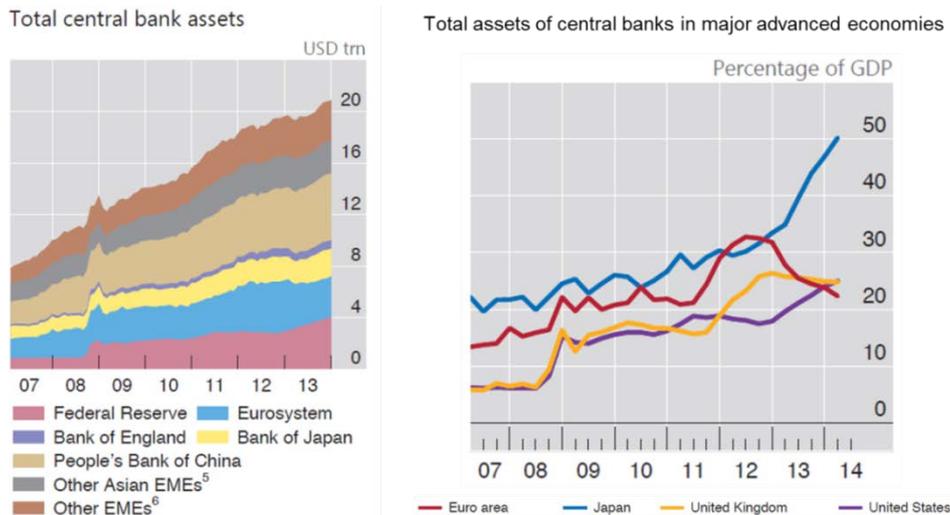
BOJ's asset purchases under CE and QQE coupled with the integration of JGB purchase modalities brought about extraordinary changes to the size and the composition of BOJ assets. The asset size expanded to unprecedented levels (Figures 12 and 13).

Figure 12: BOJ's Rapid Asset Expansion



(Source) Author's calculations based on data published by the Bank of Japan

Figure 13: Rapid Increase in the Assets of Central Banks



(Source) Bank for International Settlements (2014), pp. 86-87

Moreover the average remaining maturity of the JGBs held by the Bank was

remarkably extended (Table 3). Figure 14 depicts the maturity distribution of BOJ's JGB holdings as of February 20<sup>th</sup>, 2015. The data reveal that the average maturity of the Bank's JGB holdings has already reached approximately 6 years and 3 months.

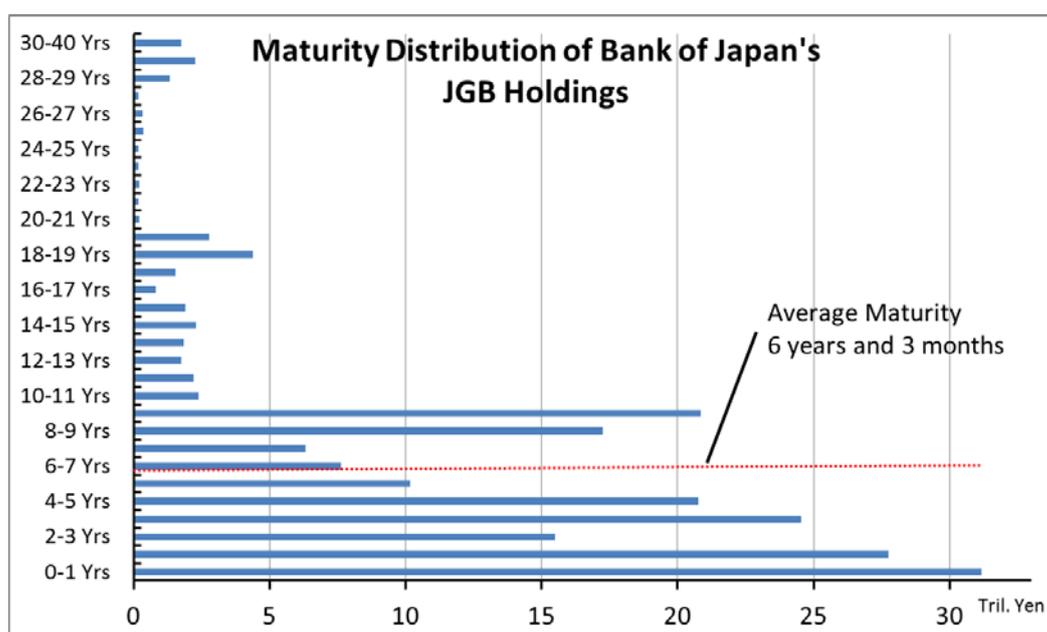
Table 3: Average Maturity of JGBs Purchased by BOJ  
years

	Flows during the fiscal years	Stock at the end of the fiscal year
Fiscal 2010	3.7	4.9
Fiscal 2011	3.0	4.3
Fiscal 2012	3.0	3.9
Fiscal 2013	7.3	5.6

Note: JGBs purchased through the APP are included.

(Source) Bank of Japan, Financial Markets Department (2014), p. 25

Figure 14: Maturity Distribution of BOJ's JGB Holdings



(Source) Author's calculations based on data published by the Bank of Japan

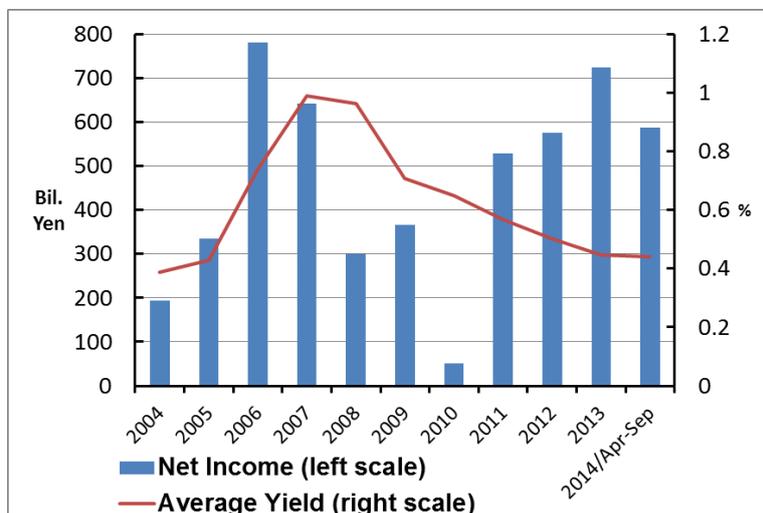
## Subsection 5.3: Projections for Bank of Japan Income during Policy Normalization

### 5.3.1: Brief Overview of Recent Developments

The expansion of BOJ assets, the maturity extension of its JGB holdings and the overall decline in the yield curve significantly affect the Bank's profit and loss statements. In recent years, up to the first half of Fiscal 2014, the Bank net income has

benefited immensely from the asset expansion factor (Figure 15).

Figure 15: BOJ's Profit Expansion



(Source) Author's calculations based on data published by the Bank of Japan

However such favorable developments will not necessarily continue. The decline and flattening of the yield curve have led to the reduction in the average yield the Bank earns from its assets as also shown in Figure 15. Moreover, maturity extension of the Bank's JGB holdings could pose a threat to future income in the event that short-term interest rates start to rise.

### 5.3.2: Assumptions for Future Income Projections

In this light, this section will provide projections for BOJ's future income<sup>18</sup>. The estimation will be based on four basic assumptions.

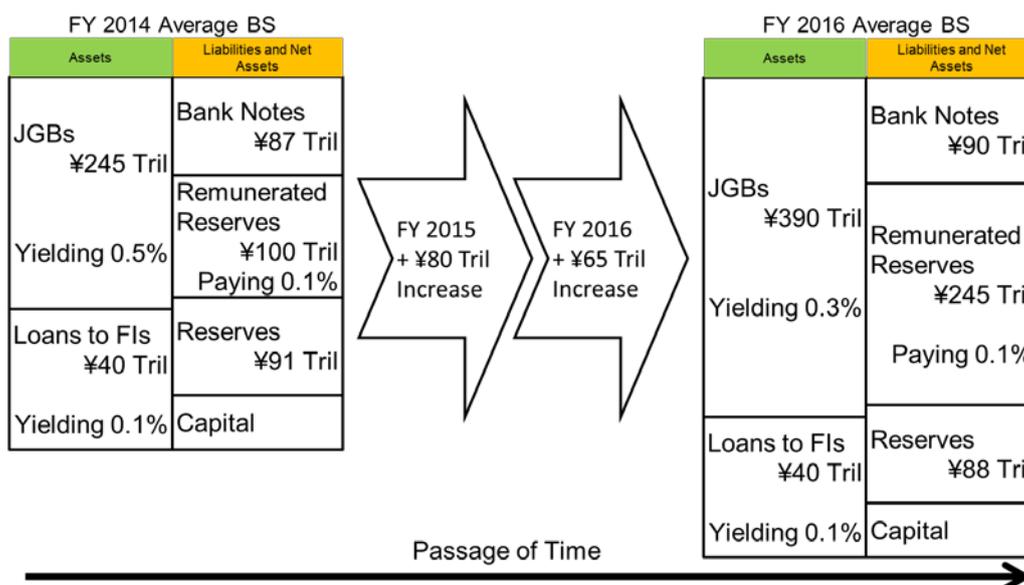
The first assumption is the simplified model balance sheet which the author constructed to simulate the Bank's earnings. As the starting point for the future developments in BOJ's balance sheet, the author estimated the average balance sheet of BOJ's Fiscal 2014 (Figure 16). The official statements for the Bank's Fiscal 2014 will not be reported before mid-2015 and so the estimation for average balance sheet for Fiscal 2014 was broadly based on the Bank's balance sheet data as of the end of October 2014, one month after the mid-point of Fiscal 2014<sup>19</sup>. The net income for

<sup>18</sup> The author was inspired and motivated by the earlier works of Iwata and Japan Center for Economic Research (Eds.) (2014, in Japanese). Presumably because the average maturity of BOJ's JGB holdings has been further extended since their publication, the income projections estimated in this paper show a bleaker picture of the future than their estimations.

<sup>19</sup> In order to estimate the average for Fiscal 2014, the balance sheet at the end of October 2014 rather than the midpoint, the end of September 2014, was chosen to take into consideration the fact

Fiscal 2014 based on this estimated average balance sheet of BOJ was calculated as ¥ 1050 billion, which coincides with approximately twice the size of net income the Bank earned in the first half of Fiscal 2014.

Figure 16: Simplified Model Balance Sheets of the Bank for Fiscal 2014 and 2016



(Source) Author’s estimations based on data published by the Bank of Japan

The second assumption is that BOJ will succeed in reaching the price stability target of 2 % CPI inflation at around the end of Fiscal 2015, which is the end of March 2016. This is in line with the Bank’s own forecast stated in the semiannual Outlook Report<sup>20</sup>. This assumption implies that gradual changes in the policy framework might occur only after the end of Fiscal 2015.

The third assumption is that monetary policy normalization after Fiscal 2016 will follow the similar process which the Federal Reserve System in the United States is planning to take<sup>21</sup>. Policy normalization is assumed to be carried out in the following

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that Bank in late October 2014 announced an acceleration in the pace of JGB purchases from ¥ 50 trillion per year to ¥80 trillion per year.

<sup>20</sup> In the “Outlook for Economic Activity and Prices (October 2014)” published on October 31<sup>st</sup>, 2014, BOJ projected that CPI inflation is likely to “subsequently accelerate gradually and reach around 2 percent -- the price stability target -- around the middle of the projection period; that is, in or around fiscal 2015.” The Bank broadly maintained this projection in the interim assessment disclosed on January 21<sup>st</sup>, 2015.

<sup>21</sup> Please see “Policy Normalization Principles and Plans” which the Federal Open Market Committee (FOMC) of the Federal Reserve System announced in September 17<sup>th</sup>, 2014. The document can be located at the following URL.

<http://www.federalreserve.gov/newsevents/press/monetary/20140917c.htm>

order.

1. First comes the so-called tapering, which is the gradual reduction in the pace of asset purchases.
2. Second is the termination of asset purchases.
3. Third is the start of very gradual policy rate hikes.
4. Fourth, BOJ will abstain from selling the assets it purchased and will hold onto each asset until its maturity.

Please note that asset purchases including JGB purchases are assumed to continue even after BOJ succeeds in reaching the price stability target of 2 % CPI inflation at around the end of March 2016. Thus the author assumes that the increase in BOJ's JGB holdings and the matching increase in the monetary base including the remunerated reserves<sup>22</sup> would be ¥ 80 trillion and ¥ 65 trillion for the average balance sheets of Fiscal 2015 and Fiscal 2016 respectively (Figure 16)<sup>23</sup>. BOJ's JGB holdings are assumed to peak in Fiscal 2016.

The fourth assumption is regarding future interest rates. The future path of interest rates is assumed to follow the implied forward rates calculated using JGB data published by the Ministry of Finance. These rates will be applied to the interest rates BOJ pays to the commercial banks for excess reserves held in the Complementary Deposit Facility<sup>24</sup>. In addition, it is assumed that financial institutions (FIs) which borrow loans from BOJ will be charged interests at a rate 0.2 % points higher than the rate applied to remunerated reserves.

Based on implied forward rate data as of February 20<sup>th</sup>, 2015, the future rate hikes will be very slow and gradual. The interest rates paid for remunerated reserves are not expected to exceed 0.5 % before 2020.

Based on the four assumptions explained above, this paper will calculate the future income of BOJ<sup>25</sup>. But there remains yet one important element which is critical in

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<sup>22</sup> For excess reserves, BOJ currently provides a facility named "Complementary Deposit Facility" for which the Bank currently pays an interest rate of 0.1 %.

<sup>23</sup> This is contemplating JGB increases of ¥ 80 trillion per year during Fiscal 2015 until the end of March 2016 and further JGB increases of ¥ 50 trillion during Fiscal 2016. For Fiscal 2016, the author is assuming "tapering" in the pace of yearly purchases of JGBs to the pre-October 2014 pace.

<sup>24</sup> Please see again "Policy Normalization Principles and Plans" which the Federal Open Market Committee (FOMC) of the Federal Reserve System announced in September 17th, 2014. The Federal Reserve stated that during policy normalization, "the Federal Reserve intends to move the federal funds rate into the target range set by the FOMC primarily by adjusting the interest rate it pays on excess reserve balances." This paper's assumption regarding the interest rates BOJ pays for excess reserves is broadly following the Federal Reserve's normalization principles.

<sup>25</sup> In addition to the four assumptions described in the main text, it is assumed that the Bank will continue to earn the same yield of 0.3 % from JGB holdings after Fiscal 2016 and will continue to annually pay the same amount of "General and Administrative Expenses and Costs" of ¥ 190 billion

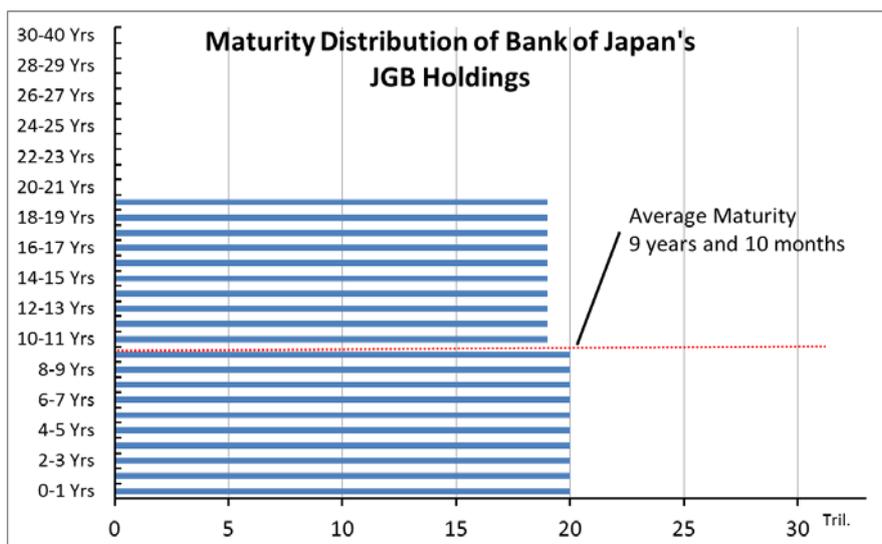
making any estimates on future income.

Projections of future BOJ income will depend on how quickly the Bank can downsize its extraordinarily expanded asset portfolio. However, this paper made a practically reasonable assumption that the Bank will abstain from selling the assets and will hold onto each asset until its maturity. Therefore, the downsizing pace will critically depend on the maturity distribution of the Bank’s JGB holdings in Fiscal 2016, the year when the asset size is assumed to reach its peak.

Unfortunately, precise information on the maturity distribution of the Bank’s JGB holdings during Fiscal 2016 will not be made available until then. In order to fill this gap, this paper will envision the following two different maturity extension scenarios which would determine the assumed maturity distribution of the Bank’s JGB holdings during Fiscal 2016 and the subsequent path of the Bank’s asset downsizing.

The first scenario will be named the Extreme Extension Scenario. On October 31<sup>st</sup>, 2014, the Bank announced “[t]he average remaining maturity of the Bank's JGB purchases will be extended to about 7-10 years (an extension of about 3 years at maximum compared with the past).” In line with this policy statement, it is assumed that, in Fiscal 2016, the Bank will extend the average maturity of JGB holdings to around 10 years and build a JGB portfolio almost evenly distributed across all maturities between 1 year and 20 years. Figure 17 depicts the maturity distribution of the Bank’s JGB holdings under this Extreme Extension Scenario.

Figure 17: Maturity Distribution under the Extreme Extension Scenario



(Source) Author’s assumptions

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as it did in Fiscal 2013.

The second scenario will be named the Moderate Extension Scenario. In this scenario, it is assumed that the maturity distribution of BOJ's JGB holdings will maintain the same composition depicted in Figure 14. Thus, the assumed average maturity of the Bank's JGB holdings will remain the same at approximately 6 years and 3 months under the Moderate Extension Scenario.

Figure 18 depicts the projections of BOJ's average balance sheet for Fiscal 2024, which is the 8th year after the Bank starts its asset downsizing. The comparison of the 2 balance sheets shows a large difference in the total asset size as well as in the size of the remunerated reserves which determines the future cost estimate for the Bank.

Figure 18: How BOJ Balance Sheet Would Appear in Fiscal 2024

Projections of FY 2024 average BS based on 2 Scenarios

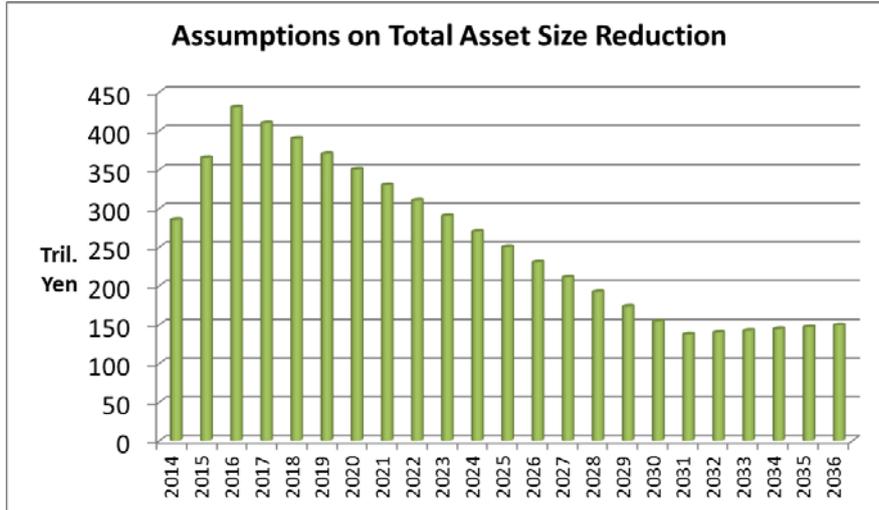
Under Extreme Extension Scenario		Under Moderate Extension Scenario	
Assets	Liabilities and Net Assets	Assets	Liabilities and Net Assets
JGBs ¥230 Tril Yielding 0.3%	Bank Notes ¥105 Tril	JGBs ¥160 Tril Yielding 0.3%	Bank Notes ¥105 Tril
	Remunerated Reserves ¥150 Tril Paying 1.7%		Remunerated Reserves ¥80 Tril Paying 1.7%
Loans to FIs ¥40 Tril Yielding 1.9%	Reserves ¥8 Tril	Loans to FIs ¥40 Tril Yielding 1.9%	Reserves ¥8 Tril
	Capital		Capital

(Source) Author's assumptions

### 5.3.3: Future Income Projection under Extreme Extension Scenario

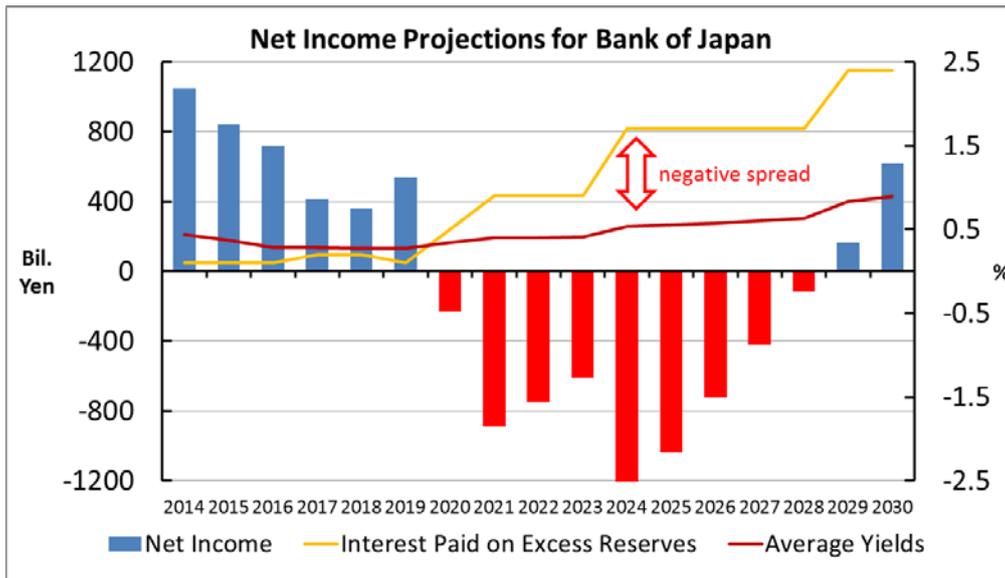
Under the Extreme Extension Scenario, BOJ will be able to downsize its asset size only gradually (Figure 19). As a result, it is estimated that the Bank may suffer from the negative interest rate spread and may incur heavy losses between Fiscal 2020 and 2028 (Figure 20). Total losses during the 9 years are estimated to exceed ¥6 trillion and to deplete a substantial portion of the Bank's capital.

Figure 19: Gradual Asset Reduction under Extreme Extension Scenario



(Source) Author’s assumptions

Figure 20: BOJ Net Income Projection under Extreme Extension Scenario



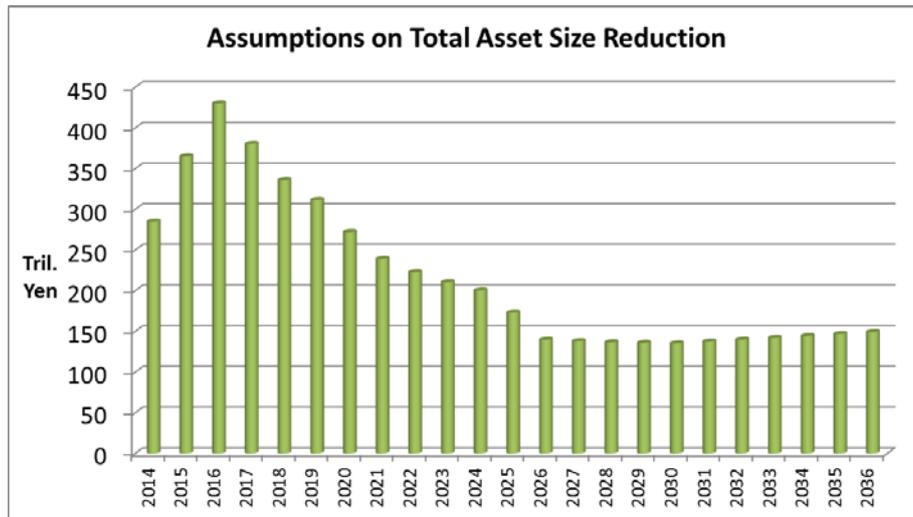
(Source) Author’s projections based on data published by the Bank of Japan

It should be understood that such large losses are caused by the maturity composition of the Bank’s balance sheet structure. In general, commercial banks which hold long-term assets funded by short-term liabilities and perform maturity transformation functions in financial intermediation are exposed to such risk of loss when interest rates increase. Central banks with similar maturity composition of assets and liabilities would face similar difficulties.

### 5.3.4: Future Income Projection under Moderate Extension Scenario

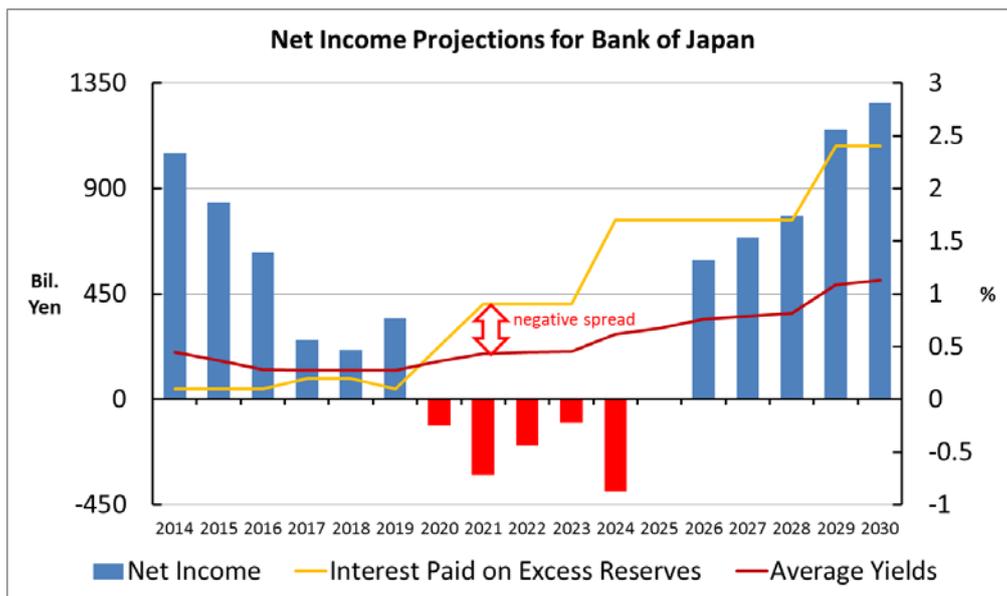
Under the Moderate Extension Scenario, BOJ will benefit from a good head start in downsizing its asset size in the first several years after Fiscal 2016 (Figure 21). As a result, it is estimated that the years that the Bank may incur losses from the negative interest rate spread would be limited to five years between Fiscal 2020 and 2024 (Figure 22). Total losses during the 5 years are estimated to exceed ¥1 trillion.

Figure 21: Rapid Asset Reduction under Moderate Extension Scenario



(Source) Author's assumptions

Figure 22 BOJ Net Income Projection under Moderate Extension Scenario



(Source) Author's projections based on data published by the Bank of Japan

Even under this Moderate Extension Scenario, however, it is estimated that BOJ may incur losses. This is because of the negative interest rate spread which is an inevitable consequence of the maturity extension in the central bank asset composition. BOJ would be holding onto long-term assets including JGBs and such assets need be funded by short-term liabilities which could face cost increases.

Some may argue that the Bank can elect not to pay interest on excess reserves. Even if the Bank chose not to pay interest on excess reserves, it would nonetheless have to issue some form of debt instruments such as reverse repos so that the Bank can continue to hold and maintain the huge asset portfolio including long-term JGBs. Such debt instruments would have to pay a positive nominal interest in order to compensate for the positive inflation expectation which may well be anchored around the price stability target of 2 %.

Others may argue that the Bank can elect to sell a part of its JGB holdings in order to accelerate the downsizing of its assets. However it is very difficult to envision an environment where BOJ would be able to sell the JGBs without incurring any capital losses. As previously mentioned, the estimate in this paper is based on the assumption that the Bank would succeed in maintaining the price stability target, 2 % CPI inflation, in a stable manner. Higher inflation expectations during the post-success periods would likely be reflected in higher yields for JGBs traded in the market which would entail value loss of such securities.

It may seem ironic that BOJ's monetary policy success in achieving the price stability target would harm the prospects of avoiding future losses. But policy makers and the general public should come to terms with the harsh realities which awaits the Japanese economy. The flattened yield curve held down at extremely low levels and the maturity extension of the Bank's JGB holdings, which are both intended byproducts of BOJ's unconventional monetary policies including policy duration commitment in the recent years, would not allow the Bank to escape the inevitable consequences of the interest rate squeeze.

#### **Subsection 5.4: Summary and Lessons Learned**

BOJ's unconventional monetary policy including policy duration commitment has succeeded in flattening and bringing down the yield curve at extraordinarily low levels. These developments are intended outcomes and significant achievements of the Bank's policy actions in the past 15 years.

However, when such unconventional monetary policy actions include the central bank's large scale purchase of long-term assets coupled with the maturity extension of

the asset portfolio, unintended consequences may arise. The prospect for central bank losses is one of such unintended but inevitable consequences.

Central bank losses or insolvencies may not necessarily lead to “bail-out” of the central bank by the government using taxpayer money. But, when the central bank is suffering from losses, the central bank would not be able to remit to the government the bank’s net income which the government would expect to receive under normal circumstances<sup>26</sup>.

Therefore BOJ and the Japanese government would not be able to escape the quasi-fiscal policy consequences or, to say the least, the fiscal implications caused by its future income flows during the process of monetary policy normalization. The losses the Bank is estimated to suffer in the first half of the 2020’s could be interpreted as indirect fiscal subsidy paying Japanese taxpayer money to the depositors at Japanese commercial banks. BOJ would be paying interest to the commercial banks to compensate for inflation expectation stably anchored around 2 %.

From another perspective, the Bank’s estimated losses in the first half of the 2020’s could be understood as the consequence of unintended inter-temporal transfer of wealth from the 2020’s to the mid-2010’s. As shown in Figure 15, the Bank is benefiting from large income caused by asset expansion in the mid-2010’s.

Three lessons could be learned.

First is the need for cost benefit analysis of maturity extension. Unconventional monetary policy tools such as large-scale asset purchases coupled with policy duration commitment all contributed to bringing down the yield curve. But the comparison of Figure 20 and Figure 22 suggests that maturity extension of JGB purchases or JGB holdings would entail larger losses for BOJ in the future. Both the benefit and cost of JGB maturity extension should be carefully reexamined and compared when the Bank considers further extension of average maturities for JGB purchases.

Second is the need to consider increasing BOJ’s own reserve fund. As suggested previously, if the Bank and the Japanese government were to recognize that the extraordinary profits the Bank is recording in the mid-2010’s could be the consequence of inter-temporal transfer of wealth from the first half of the 2020’s when the Bank is projected to record losses, a more rapid increase in the Bank’s own reserve fund could be justified. A larger legal reserve fund would work as the buffer for potential losses

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<sup>26</sup> Article 53 of Bank of Japan Act entitles the national treasury of the Japanese government to receive the remaining surplus of the Bank’s income after deducting the reserves and dividend payment. For example, based on the financial statements for Fiscal 2013, BOJ paid ¥ 579 billion to the Japanese government, which constitutes nearly 13 % of the Japanese government’s non-tax revenue of ¥ 4,631 billion which was expected in the initial budget for Fiscal 2014.

in the future. In this regard, the author views as promising the recent developments where the Bank transferred to the legal reserve, with authorization from the Minister of Finance, larger portions of the annual surplus than what the Bank of Japan Act would require<sup>27</sup>.

Third is recognition of fiscal democracy principles. In general, monetary policy actions, whether they are conventional or unconventional, cannot avoid fiscal consequences or fiscal implications. And monetary policy actions of many central banks are protected by operational independence. But monetary policy independence does not justify economic policies of any kind to circumvent democratic rules on fiscal policy. It is worthwhile considering what would be the most appropriate way central banks and the government could inform the taxpayers or the general public about the monetary policy impact on future net income of the central bank and its quasi-fiscal policy consequences.

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<sup>27</sup> According to the Bank of Japan's Appropriation of Net Income for the 129th Fiscal Year/ Fiscal 2013, the Bank transferred to its Legal Reserve Fund ¥ 145 billion, which constitutes 20 % of the Bank's Net Income for Fiscal 2013 which reached ¥ 724 billion. Article 53 of Bank of Japan Act requires the Bank to transfer 5 % of the surplus Net Income.

## **Section 6: Central Bank Challenges in the Age of Forward Guidance**

Forward guidance or more specifically BOJ's policy duration commitment constitutes an essential part of unconventional monetary policy instruments which the central banks invented, employed and developed in the 21<sup>st</sup> century. The simple empirical analysis employed in this paper found that the market believes or perceives that the Bank's policy duration commitment is a credible commitment, which has in turn helped the Bank to manage expectations of future interest rates and control the level and shape of the yield curve at an extraordinarily low range. The suppressed yield curve has helped businesses and households to decrease their financing costs and has supported macroeconomic recovery and growth as well, which may indicate that the conventional policy transmission mechanisms of the interest rate channel and the credit channel are at work.

However, forward guidance including policy duration commitment does have its share of difficulties. The impact of forward guidance including policy duration commitment was never assured or stable. And its magnitude has been time-variant. Evolution in the policy frameworks and improvement in communication skills appeared to have played crucial roles in enhancing the effect of policy duration commitment. More importantly, the extraordinarily low and flattened yield curve, if coupled with maturity extension of central bank assets, would pose threats to the future income of central banks, which could have serious fiscal implications.

Therefore, three issues or challenges are worthy of further discussions or studies with regard to forward guidance or policy duration commitment of central banks.

First is with regard to the operational aspect. Sooner or later, economies will have to tackle with monetary policy normalization and unwinding of many of the unconventional policy measures. But, in this process of policy normalization, central banks are likely to continue utilizing forward guidance or policy duration commitment. The intellectual assets central banks have accumulated through managing and controlling market expectations in the past decade are too valuable to dispense with.

However, central banks have limited experience in employing forward guidance or policy duration commitment during macroeconomic cycles when monetary accommodation is removed or when interest rates rise. It is much easier to commit to maintaining future policy rates at a certain low level than to communicate the central bank's precise intentions on the timing, frequency, pace and extent of future interest rate hikes to the market. Therefore, both central banks and participants in the global financial markets have to learn and further develop communication skills in the coming policy normalization era.

Second is with regard to the theoretical aspect. Should we not focus more on the interest rate channel of monetary policy transmission mechanisms? Recent developments in central bank policies have attracted much attention to the monetary quantity variables such as the monetary base or the size of central bank assets and their dynamic impact on expectations of future developments in macroeconomic variables.

In contrast, central bank policy rates and other interest rates do not necessarily play a large role in theoretical models of academic monetary economics. Therefore, academic refocus on the conventional interest rate channels of policy transmission mechanisms and further research utilizing yield curve information including both level and slope data might help policy makers and central bank practitioners to comprehend and analyze the costs and benefits of monetary policy actions including forward guidance and policy duration commitment. The author is encouraged by Fujiwara et al (2014) calling for sound theoretical backgrounds in public policy and also by Friedman (2014) recommending monetary policy theories to recognize the existence of multiple policy instruments.

Third is with regard to institutional aspects of economic policies. In many economies, operational independence of monetary policy is protected by law or by social conventions. Recent experience with unconventional monetary policy involving yield curve flattening and maturity extension has revealed that monetary policy could pose potential risks to future central bank income and could lead to quasi-fiscal policy consequences.

Monetary policy independence does not justify economic policies circumventing democratic control on fiscal policies. Recently, much attention is devoted to the opposite issue: the issue of the so-called fiscal dominance of monetary policy. But more attention to the issue of the monetary policy intrusion into fiscal policy may also be warranted. Therefore, both policy makers and academic scholars should consider how the taxpayers can be appropriately informed of the fiscal implications of monetary policy as well as how monetary policy independence and democratic governance of fiscal policy can be reconciled.

The author hopes this paper has contributed to further expanding and deepening the scope of debates regarding central bank policies.

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